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WITNESS my hand this
Twentieth day of August 2004

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AUSTRALIA

Patents Act 1990

**ORIGINAL**

**PROVISIONAL SPECIFICATION**

Title: SNOWBOARD BINDING

Applicant: NICHOLAS FLETCHER

The invention is described in the following statement:

# SNOWBOARD BINDING

## Field of Invention

This invention relates to a snowboard binding. More particularly, this invention relates to a snowboard binding with better facility for adjustment of foot orientation on the snowboard.

## Background Art

The following description of the prior art is not intended to be, nor should it be interpreted as, an indication of the common general knowledge pertaining to the invention, but rather to assist the person skilled in the art in understanding the developmental process which led to the invention.

Recent developments in boot binding systems for snowboards may be found in US 5,261,689, US 5,356,170 and US 5,722,680 (Dodge, et al). These documents disclose a boot binding with a base to be supported on a snowboard. The base includes a circular opening in its centre which receives a disk shaped hold-down plate. The hold-down plate may be secured to the board in several different positions on the board with the binding base assuming any position by rotation with respect to the hold-down plate. The hold-down plate is secured by screws received in holes 42 in the board. This presents a problem in the various situations, sometimes unpredictable, when a user needs to adjust the orientation of the boot binding. This most obviously occurs preparatory to the user mounting a chairlift where the orientation of the boot binding must be changed to enable the user to sit comfortably and safely on the chairlift. Once the user alights from the chairlift, the boot binding must once again be adjusted to the orientation desired for snowboarding. Another example where the difficulty of adjustment of the orientation of

the boot binding presents itself is where the user desires to skate along. Such situations may arise where the slope is insufficiently steep to enable snowboarding or a shallow incline must be traversed to get to the next slope. Casual users who hire snowboarding gear from a ski hire store are generally required to decide on their feet positions before they even get on the ski slopes. Normally an experienced operator will adjust the boot bindings on the casual user's behalf. If the casual user discovers that a slightly or even radically different orientation would be more comfortable or may even prevent injury, the casual user has little option but to persist with the binding orientations set by the hire store operator.

There is therefore a need for a binding which enables easy adjustment by novice and experienced users alike on the ski slopes.

It is therefore an object of the invention to overcome the aforementioned disadvantages of the prior art or, at least, to provide a useful alternative thereto.

**Statement of Invention**

In one aspect, the invention provides a snowboard binding including:

(a) a binding base having a front toe end and a rear heel end;

(b) an aperture in the binding base intermediate the toe and heel ends for receiving a snowboard engaging member adapted to releaseably secure the binding base to the board; and

(c) an actuator operably connected to the binding base,

wherein the perimeter of the aperture includes adjacent points adapted for relative movement by the operator of the actuator.

The adjacent points may be spaced a certain distance in a first position and spaced a different distance in a second position. The spacing between the adjacent points is capable of being varied by operation of the actuator to vary the space between the adjacent points, such as when they are in the second position compared to the first position.

The snowboard is typically elongate with rounded ends and comprises a substantially planar board with upturned ends. In plan view, the snowboard may be slightly wider in diameter at its respective ends and may include a range of holes for receiving the boot binding at any one of a number of longitudinal positions along the length of the snowboard. Typically, of course, the snowboard will have provision for a pair of boot bindings corresponding to a user's right and left feet.

The binding may further include lateral side supports to support the instep and outstep of a boot. The side supports may extend substantially vertically from the base and may generally follow the contour of a typical snowboarding boot. The side supports may include engagement means for securing the boot to the binding. The boot engagement means may include deflectable flanges which releasably engage a corresponding shoulder of the boot on one or both of the instep or the outstep of the boot. The engagement means may be easily releasable by actuation of a lever which may be operably connected to the engagement means. In a preferred form, the boot engagement means may comprise step-in engagement means including opposed rotatably deflectable flanges for engaging the sole rim of the boot on the instep and outstep, respectively. In this way the flange in each case rides over the sole rim and locks above the sole rim thereby securing the boot in the binding. The boot is preferably held in place in the binding by strong spring biasing

whereupon, on application of sufficient twisting or other exiting force, the boot is releasable from the engagement means to reduce the risk of injury.

The binding may also include a heel support such as a concave elongate semi-cylindrical plate extending up from the heel end and optionally adjustably mounted to the side supports or the base. The ankle support may be adjustably mounted so that it is rotatable about vertical and horizontal axes and is longitudinally slidable along a small portion of the length of the base to accommodate a wide variety of boot shapes and sizes and personal user preferences.

The aperture is preferably round. However, it may be variously shaped whereby to accommodate at least two binding orientations in co-operation with the board engaging member. For example, the aperture may comprise one or more intersecting slots adapted to cooperate with the board engaging member. The aperture may be rectangular, four or more point star shaped, polygonal etc. Preferably, the aperture is circular.

The function of the board engaging member is to lock the binding in any one of a number of orientations so that the binding is substantially incapable of vertical movement relative to the snowboard and of rotational movement about an axis normal to the plane of the board. Accordingly, the board engaging member and the aperture preferably have complimentary surface shapes and features which combine to prevent such vertical and rotational movement of the binding relative to the board.

To prevent vertical movement of the binding relative to the board, the base defining the aperture may include one or more horizontally extending features such as flanges which are engageable by corresponding horizontally extending features of the board engaging member. Where the member and the aperture are correspondingly

circular, the member may be rotatable on insertion whereby to lock one or more of its horizontal extending features under a corresponding horizontally extending feature of the base. However, preferably the base defines a frusto conically shaped aperture having an inwardly sloping wall such that the diameter of the aperture on the top surface of the base is wider than the diameter of the aperture in the plane of the underside of the base. The board engaging member may be corresponding frusto conically shaped whereby its insertion and securement in the aperture prevents vertical movement of the binding relative to the board.

The surface features of the aperture internal wall preventing rotation of the binding about a vertical axis relative to the board may include a combination of complementary ridges, grooves, corrugations, teeth or the like whereby to permit changes of adjustment by rotation through a wide range in very small increments. The complementary surface features may be included on the base defining the aperture and the board engaging member. Alternatively, the teeth etc may be on either (1) the base defining the aperture or (2) the board engaging member and the other of these components may include an engagement surface adapted to grip the surface features by having a surface capable of deflection or distortion. For example, one of the board engaging member or the aperture may include a compressible surface, such as plastic, foam or rubber which cooperates with the other surface by high frictional contact to prevent rotation of the binding relative to the board engaging member and the board itself. Alternatively, both the internal wall surface of the aperture and the board engaging member may each include a high frictional surface, such as respective rubber or rubber-like surfaces adapted for mutual frictional engagement.

Preferably, the aperture wall includes at least a portion of teeth or other high friction surface features to which the rim of the board engaging member may engagingly cooperate. The person skilled in the art will of course appreciate that the high friction surface features may equally be found on the board engaging member. The board engaging member preferably includes complementary surface features to ensure positive engagement with the aperture. However, in a particularly preferred embodiment, the rim of the board engaging member, or at least a portion thereof, may be lined by a compressible surface material, such as a hard, but compressible plastic or rubber material, whereby to provide means for high frictional engagement with the aperture. This compressible surface feature enables an infinite number of rotated potential positions to be adopted by the binding as the compressible surface may frictionally cooperate with the surface feature of the corresponding component at any point along the compressible materials length. The compressible surface may alternatively have little or no resilience, whereby it is deformed to conform complementarily to the contours of the opposing co-operating surface and the compressible surface remains permanently modified by the opposing surface.

The board engaging member may be disc shaped. The board engaging member may be generally circular and adapted to co-operate with a generally circular aperture. The board engaging member may include multiple contact surfaces which follow the generally circular periphery of the board engaging member or disc, which contact portions may be variously spaced circumferentially. By providing only a portion of the peripheral surface of the disc for contact with the internal wall surface of the aperture, the amount of surface area contacting the internal wall surface is reduced. The reduction of the contact surface

area may facilitate the more efficient and easier relocation of the disc in the aperture. The proportion of contact surface of which the contact portions comprise of the total peripheral surface area of the disc may be varied, depending on the required strength of the engaging connection between the board engaging member and the aperture.

The spaces between the contact portions are preferably filled to resist ingress of snow and ice which may make the apparatus unworkable if compacted ice is permitted to form in the intervening spaces between the contact portions. Accordingly, the contact portions may comprise surfaces which extend slightly proud of the generally circular external surface of the board engaging member. Alternatively, cutout portions may be provided to space the contact portions and reduce the contact surface area. The intervening surface area may be filled by a material different to the hard plastic material of which the board engaging member comprises. For example, the space filler may be a hard or soft rubber or rubber-like material. Preferably, the filler material is in the form of a disc with raised portions to correspond to the cutout portions of the hard disc material of the board engaging member.

The board engaging member may be anchored to the snowboard using a variety of fastening means which the person skilled in the art will readily appreciate. The most common engagement means would include bolt means extending through suitable apertures in the board engaging member adapted to co-operate with a complementary bolt housing anchored in the snowboard. The suitable apertures may be arranged in a variety of patterns whereby to ensure strong and preferably symmetrical engagement of the board engaging member with the snowboard. The board engaging member may include multiple

slots adapted to receive such bolts and may be arranged in opposed pairs, triangles, rectangles etc. as required.

The adjacent points may correspond to a continuous gap in a wall defining the aperture. The gap may extend through the base in a generally outward direction relative to the centre of the aperture so that the gap is continuous from the aperture to the outside of the binding base. Alternatively, the gap may not extend fully through the base but may be in the form of a V which has an apex at a point intermediate between the aperture and the exterior of the base. In any event, there should be sufficient flexibility in the material and construction of the base to permit the adjacent points to be varied to permit the binding to be rotated about a vertical axis without having to release the board engaging member from the board.

Preferably, the adjacent points correspond to opposed points of a continuous gap which extends from the aperture through to the exterior of the base. The gap may be simply formed by cutting a vertical or inclined slot through the base. If the gap is so formed, it is preferable that the gap be inclined. The gap may be stepped whereby the gap includes opposed horizontal surfaces which are adapted to slide in opposed horizontal directions relative to one another to vary the width of the gap. Preferably, the gap, even in the first closed position, defines a sufficient gap to permit the clearance of snow and ice.

The adjacent points may be at any one of a number of positions on the aperture and may be either directly in front of the toe oriented towards the big toe, oriented towards the small toe, oriented straight back towards the heel, oriented to one side of the heel, or may be directed towards the instep or the outstep of the base. Preferably, the adjacent points and the corresponding gap are oriented towards the big toe. The gap may vary in spacing

throughout its length. For example, the gap may be narrower at the adjacent points than at opposed points further along the length of the gap. Preferably the gap in the closed position is about 3 to 7mm, preferably 5mm, at the adjacent points and about 5 to 12mm, preferably 9mm, at the opposed points. The opposed points may be at the periphery of the base or may be intermediate the aperture and the periphery where the gap is V-shaped.

The actuator may operate to vary the space between the adjacent points by space variation means. The space variation means may be provided in a number of different forms, that the space variation means is operable to vary the space between the adjacent points, and more particularly in a preferred form, to toggle between a wide open gap corresponding to the second position and a narrow (closed) gap corresponding to the first position.

The space variation means may be in the form of an over centre or cam mechanism capable of easily being shifted from the first position to the second position to vary the space between the adjacent points. The space variations means may be in the form of a cam having a finger operated lever which is easily manipulated by a user with minimal dexterity, such as may be the case for a user with cold or gloved hands.

The space variation means may include a rod which extends through the gap, preferably intersecting the gap. A working end of the rod may be located adjacent a peripheral portion of the base and may be anchored to the base at a point on the opposed side of the gap. The anchor point may be internal to the base or may be located on a peripheral portion of the base. Preferably, the anchor point is located within the base structure.

It will be appreciated that, by the operation of the space variation means, the spacing between the actuator and the anchor point may be varied between two or more positions and that, correspondingly, the gap may be widened or narrowed according to the manipulation of the actuator. Alternatively, the space between the actuator and the periphery of the base may be varied, the space between the actuator and the anchor point remaining substantially constant.

To reduce the amount of material used to manufacture the binding including the base, the base may include open portions with strengthening struts in the toe portion of the base. This may be achieved without compromising significantly on the performance of the base in snowboarding action. Correspondingly, it has been observed by the inventor that the majority of the stress on the binding is through the heel portion and, only to a lesser extent, through the instep and outstep and toe portions. Accordingly, for this reason it is preferred that the adjacent points be located towards the front of the base, such as toward the toe area where there are less stress demands on the base and effectively no prospects of structural failure.

**Brief description of the drawings**

The invention may be better understood from the following non-limiting description of possible and preferred features of one or more of the preferred embodiments of the invention. It is to be understood that the features illustrated and described with reference to the drawings are not to be construed as limiting on the scope of the invention.

In the drawings:

Figure 1a shows a gap in a binding in a big toe position;

Figure 1b shows a gap in a small toe position on a binding;

Figure 2a shows a gap in a heel/instep position;

Figure 2b shows a gap in a heel/outstep position;

Figure 3 shows a stepped gap in a closed position;

Figure 4 shows the stepped gap of Figure 3 in an opened position;

Figure 5 shows an inclined gap;

Figure 6 shows a tongue and groove gap arrangement;

Figure 7(a) is a plan view of a board engaging member according to one embodiment;

Figure(b) is a plan view of a board engaging member according to another embodiment;

Figure 7(c) is a plan view of a board engaging member according to another embodiment;

Figure 7(d) is a plan view of a board engaging member according to yet another embodiment.

Figure 8 shows a binding system from a plan view;

Figure 9 shows a side perspective view of the embodiment shown in Figure 8;

Figure 10 is a top plan cut away view of the embodiment of Figure 1a showing the length and orientation of a bolt;

Figure 11 is a top plan cut away view of the embodiment of Figure 1b showing the length and location of a bolt;

Figure 12 is a top plan cut away view of the embodiment of Figure 2a showing the length and location of a bolt;

Figure 13 is a top plan cut away view of an embodiment of the invention showing an actuator located at the heel/instep position;

Figure 14 is a perspective view of space variations means in the form of a cam lever and bolt combination.

Figure 15 is a front perspective view showing surface features of an aperture according to another embodiment;

Figure 16 is a front perspective view of another embodiment showing surface features of an aperture;

Figure 17 is a front perspective view of a binding showing surface features of an aperture according to another embodiment;

Figure 18 is a lower perspective view of a board engaging member in the form of a disk showing a rim having a continuous circular surface lined with rubber material;

Figure 19 is a lower perspective view of a board engaging member having surface features in the form of teeth;

Figure 20 is a front perspective view of a boot binding and the board engaging member shown in Figure 18;

Figure 21 is a front perspective view of a boot binding and board engaging member according to another embodiment;

Figure 22 is a plan view of a snowboard showing a pair of boot bindings mounted for orientation in a ride position;

Figure 23 is a plan view of a board with a pair of boot bindings mounted for orientation in the skate or chair lift position;

Figure 24 is a front perspective view of the arrangement shown in Figure 6 modified to accommodate an overcentre buckle; and

Figure 25 is a side perspective view of the overcentre buckle shown in Figure 24.

**Detailed description of the drawings**

Referring firstly to Figures 22 and 23, there is shown a snowboard 1 having a typical snowboard footprint to which is mounted, on the top side of the snowboard 1 a pair of boot bindings, namely a left boot binding 2 and right boot binding 3. In Figure 2, the boot bindings 2, 3 are oriented in the right position for a snowboarder intending to lead with his right foot. In Figure 23, the right boot binding 3 is shown rotated in the direction R to enable the snowboarder to skate on the snowboard 1 and to also enable the snowboarder to mount and alight from a chair lift. The snowboarder is able to adjust the right boot binding 3 (and optionally the left boot binding 2) according to the invention on site on the slopes by easy manipulation of an actuator in the form of a lever 4. Actuation of the lever 4 lessens the grip of the binding 3 from a board engaging member 5 to enable rotation of the binding 3 about the board engaging member 5 about an axis normal to the plane of the snowboard 1. When the binding 3 has been rotated to its desired orientation, the lever 4 may be flipped back into the closed position, thereby again clamping the binding 3 to the board engaging means 5 and the board 1.

Turning to Figure 14, it can be seen that the lever 4 is rotatably engaged to a rod 6 which has a free threaded end 7 in turn threadably engaged to a bolt house 8. In Figures 9 and 14 the lever 4 is shown in a closed position in which the distance between the lever axis of rotation 9 and a cam surface 10 of the lever 4 is greatest thereby pulling the bolt house 8 close to the cam surface 10. As the lever 4 is rotated clockwise in a direction D

(out of the page) the distance between axis 9 and cam surface 10 decreases permitting bolt house 8 to extend further away from the cam surface 10, i.e. to the open position. Accordingly, the lever 4 is operable to correspondingly open and close a gap 22 as will be described in detail with reference to Figure 8 below.

As shown in Figures 10 through to 13, the rod 6 may be variously dimensioned to accommodate different orientations and positions of the space variations means corresponding to the lever 4.

As best shown in Figure 8, the right foot boot binding 3 includes a base 11 having a front toe end 12, a rear heel end 13 and a central circular aperture 14. To support the heel, ankle and calf of the right foot of a user, a heel/calf support 15 extends from the heel end 13 in a substantially vertical direction. The ankle/calf support 15 is substantially internally concave from a plan perspective whereby to comfortably surround the user's calf and ankle. The ankle/calf support may be adjustably mounted to a pair of side supports, consisting of an outstep side support 16 and an instep side support 17.

The side supports 16, 17 provide lateral support for a boot and provide the structural means for mounting boot engagement means in the form of spring loaded over centre rocker engagement means 18, 19 which enable step-in and releasable engagement of a boot for greatest convenience. Of course, the person skilled in the art will appreciate that there are a variety of boot engagement means, such as straps, buckles, clamps, etc commonly used to secure boots in the fields of snowboarding, roller blading and snow ski boot manufacture equally well adapted to secure the boot to the binding 3 without necessarily providing a step-in engagement facility. Likewise, it is not essential to the invention that the ankle/calf support 15 be positively adjustable relative to the base 11 or

side supports 16, 17, but may be fixed at a comfortable position or angle to accommodate a typical user stance and optionally provide sufficient flexing at the join between the support 15 and the side supports 16, 17 or the base 11 to provide adequate performance and comfort characteristics. The support 15 and heel end 13 preferably further include padded or cushioned areas 19, 20 for improved user comfort and support.

The toe end 12 may be formed as a solid structure but, more preferably, may include open portions 21 to save on materials and decrease the weight of the binding 3 without compromising materially on the strength of the toe end 12.

In Figure 8, intermediate the area corresponding to the big toe and second toe is a gap 22 extending from a pair of adjacent points 23, 24 on the interior wall 25 of the base 11 defining the aperture 14. The gap 22 extends from the adjacent points 23, 24 to an external surface 26 of the toe end 12. Of course, the left foot binding 2 will be substantially the mirror image of the right foot binding 3 as described with reference to Figure 8.

In Figures 1a and 1b and Figures 2a and 2b, gaps 27, 28, 29a, 29b (similar in principle to the gap 22) are shown in four different optional locations on the base 11. In Figure 1a, the gap 27 is shown in the same orientation as gap 22 in Figure 8, but the gap 27 does not extend fully through the base 11 to the external surface 26. Instead, it terminates at an intermediate point in the base 11. In such an arrangement, the base 11 material is of sufficient flexibility whereby the release of the lever 4 sufficiently releases the grip of the base 11 on a board engaging member (not shown) received in the aperture 14 to enable the base 11 to be released from the grip of the board engaging member to allow its rotation relative thereto.

In Figure 1b, the gap 28 is shown in the small toe position. In Figure 2a, the gap 29a is shown in the inside heel position and in Figure 2b the gap 29b is shown in a position corresponding to the outside of the heel at the rear end 13. In Figure 2a, a lever 4a extends from the periphery of the base at the instep heel area and the associated rod (not shown) extends laterally into the heel area 13a where the bolt housing (not shown) is anchored. The rod intersects the gap 29a and is operable to open and close the gap 29a as required by the user's manipulation of the lever 4a. A similar arrangement is shown in Figure 2b in which a gap 29b is alternatively located on the out-step side of the heel end of the binding. Although the location of the gaps 29a, 29b in Figures 2a and 2b, respectively, perform satisfactorily, it is preferred that the gap 27, 28 be located at the toe end 12 of the binding 3 as the toe end 12 is subject to considerably less stress during use than the heel end 13. In any event, the risk of structural failure due to the presence of the gap at any point on the base 11 is materially very low to the extent that there is no material risk of failure during the normal life of a snowboard boot binding.

Advantageously, the gap may be formed in existing boot bindings post-manufacture so that existing stock in, for example, ski hire outlets, can be easily modified to incorporate the invention. Accordingly, the invention may comprise a kit for forming a gap in an existing boot binding and for inserting a space variation means, such as the lever 4 and rod 6 combination and for this purpose may optionally include suitable tools for installation thereof. One method of installing a gap and space variation means according to the invention is to: (1) cut a simple inclined gap 30 as shown in Figure 5; (2) form a recess 31 for accommodating the bolt housing 8 in the body of the base 11 by drilling a suitable bore through the top surface of the base at the position indicated by B;

(3) locating the bolt housing 8, correctly oriented, in the recess 31 so formed; (4) drilling an elongate bore 33 from the periphery of the base at the front end instep position 32 through the body of the base 11, the elongate bore 33 intersecting the gap 30 and communicating with the recess 31; and (5) inserting the rod 6 into the elongate bore 33 and threadably engaging the threaded end 7 in the bolt housing 8 by rotating the lever 4 until the rod 6 is securely anchored in the bolt housing 8. The person skilled in the art will appreciate that the recess 31 will need to be located with precision to ensure that the lever 4 is operable to increase and reduce the size of the gap 30 as required.

The gap 30, and indeed all gaps 22, 27, 28, 29a, 29b are preferably not completely closable even when the lever 4 is in the closed position because it is desirable to maintain sufficient spacing between the opposed surfaces of the gap to enable clearance of ice, sludge and snow.

As shown in Figures 3 and 4, the gap 22 may be stepped to provide better structural stability in the region of the base 11 surrounding the gap. Formation of the stepped gap 22 will generally need to be achieved by specialist machines, such as a laser cutter to achieve a desirably clean cut. The stepped gap 22 includes opposed abutting horizontal surfaces 40 which are adapted to slide relative to one another which, with the added strengthening of the rod 6, are adapted to open and close the gap 22 with minimal distortion or flexing of the base 11 out of its resting plane.

In another particularly preferred embodiment shown in Figure 6, a gap 41 may include a tongue and groove configuration which provides still more flexibility to the gap 41 by virtually eliminating relative vertical movement of the adjacent points 23, 24 through flexing of the base 11 during use. The tongue 42 and corresponding groove must

be sufficiently deep to ensure that the tongue always remains within the groove whilst permitting sufficient lateral relative displacement of the tongue to the groove. This ensures adequate spacing of the adjacent points for release of the base 11 from the board engaging member.

Although the aperture 14 is most advantageously circular, the aperture may be formed in a range of different configurations whilst still achieving a boot binding system which provides at least two alternative orientations on the board 1. Accordingly, an aperture may be multi pointed, such as a four point configuration or a six point configuration, or may be polygonal, for example, hexagonal or octagonal. The board engaging member will generally have a shape complementary to that of the aperture.

Correspondingly, as shown in Figures 7(a) to 7(d) the board engaging member 43-46 may be adapted to co-operate with a circular aperture, but the surface area of the board engaging member 43-46 which is in contact with the internal wall surface 25 of the aperture 14 may be minimised. The board engaging members 43-46 may comprise multiple contact regions 51a-d radially spaced about the periphery of the members 43-46. To prevent snow/ice collecting in the spaces 53 between the contact portions 51a-d, the members preferably include rubber or plastic inserts, such as hard or soft rubber or plastic fills 54.

The rubber fills 54 are preferably in the form of moulded discs with raised portions corresponding to the spaces 53 and drilled, stamped or cutaway holes corresponding to holes 52 of the disc members 43-46. In each case, the holes 52 of the disc members 43-46 are arranged in a rectangular configuration. However, it will be appreciated that other configurations, such as triangular are shown in Figures 18-21, pentagonal, or, as a bare

minimum, an opposed pair of slots, would provide sufficient anchorage of the members 43-46 to the board 1.

The contact portions 51a-d may include gripping means for positively gripping or engaging the internal wall surface 25, or by providing a frictional engagement means. Accordingly, the contact portions may include complementary teeth, ridges, protrusions, etc., to engage with complementary features on the internal wall surface 25 or may include a resilient rubber or rubber-like material adapted to frictionally engage with a similar material on the internal wall surface 25 or on protrusion features so formed on the surface 25.

Most preferably, the aperture 14 is circular as shown variously in the embodiments of Figures 15-17 and Figures 20 and 21. Preferably, the aperture 14 is, when viewed from a side perspective, frusto conical in shape to permit cooperation with a board engaging member in the form of a complementarily shaped disk 50 shown in Figures 18 to 21. Although the frusto conical configuration is preferred, the person skilled in the art will appreciate that many different configurations are possible which achieve the aim of using the board engaging member to clamp the binding 2, 3 in a particular orientation on the board 1. For example, the board engaging member may have stepped peripheral features or the cooperating structures of the base 11 and the board engaging member may include horizontal opposed structural members which may be rotatable or compressible to effect engagement.

The internal surface of the wall 25 of the aperture 14 may include smooth regions or may include surface features such as cogs, teeth, ridges, grooves, corrugations protrusions and the like. Preferably, the surface features occupy at least 10% (36°) of a

total 360° of a wall 25 defining the aperture 14. Still more preferably, the surface features occupy at least 45° of the total wall 25 arc. Still more preferably, the surface features occupy 90° of the wall 25 arc. The remaining wall 25 surface may be smooth, plane and/or unadorned, or may include a resiliently deformable hard plastic or other suitable material such as rubber (synthetic or natural). The surface features may alternatively be located in similar proportions on a complementary engaging wall 51 of the disk 50. The surface of the wall 25 may include no surface features from -45° to +45° at the front toe end. There may be no surface features at the rear heel end of the wall 25 corresponding to positions of -45° to +45°. The wall may include surface features from 270-315° or approximately 9 o'clock to 11 o'clock at the front end of the wall 25. By limiting the proportional area including surface features, the strength of frictional and positive engagement between the wall 25 and surface 51 is moderated and may facilitate the ease of adjustment by making it easier to loosen the aperture 14 whilst still providing sufficient friction or positive engagement to make the clamping function of the aperture effective.

Other alternatives include there being no surface features on the binding, no surface features on the plate or disk 50, or no surface features on either the plate or the binding. Accordingly, the hard but resiliently deformable material on the surface of wall 25 and complementary surface 51 may provide sufficient abutting frictional engagement to render surface features such as teeth, ridges, grooves, sprockets and the like unnecessary. Accordingly, the surface 51 may include an annular rubber washer adapted to be sandwiched between the wall 25 and the disk 50.

A myriad of effective combinations and alternatives will present themselves to the person skilled in the art. However, the preferred embodiments include a combination of

teeth on the wall 25 and a hard rubber material on the surface 51 as shown in Figure 20 or a hard rubber material on both the wall 25 and surface 51 as shown in Figure 21.

As shown in Figures 18 to 21, the disk 50 includes a triplet of triangularly arranged slots 52 through which fastening means, such as screws, may be inserted to engage the disk 50 to the board 1 by lining up the slots 52 to corresponding threaded bores (not shown) in the board 1. Whilst it is useful to describe this triangular configuration of slots 52, other engagement configurations will be readily apparent to a person skilled in the art, whereby other fastening means such as clamping means may be used to releasably attach the disk 50 to the board 1 to make sure that the disk 50 is not dislodged during use on the slopes.

Referring to Figure 24, the tongue and groove arrangement also shown in Figure 6 includes, as an alternative to the lever 4 actuator shown in Figure 6, an overcentre buckle 56, shown with greater clarity in Figure 25. The overcentre buckle 56 may be any one of a variety of standard overcentre buckle arrangements used to buckle up ski- and snowboarding boots. In Figures 24 and 25, the buckle 56 is shown in a closed position in which the lever or finger tab 57 is pressed downward into the buckle body 58 whereby to drag the hook clasp 59 towards the buckle body 58. The hook clasp 59 is anchored to the outside toe portion 60 and the buckle body 58 is immovably anchored in the inside toe portion 61 whereby the hook clasp 59 is adapted to straddle the gap 41 when in the closed position. The buckle 56 may be released, whereby to open the gap 41 to permit adjustment of the boot binding 3 relative to the board engaging member (not shown) and the board 1 itself. This is accomplished by lifting the finger tab 57 to enable the buckle end of the

hook clasp 59 to ride over an axle 62 to permit the hook end 63 of the hook clasp 59 to permit the widening of the gap 41.

When used in this specification and claims, the terms "comprises" and "comprising" and variations thereof mean that the specified features, steps or integers are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

It is to be understood that various alterations, modifications and/or additions may be made to the features of the possible and preferred embodiment(s) of the invention as herein described without departing from the spirit and scope of the invention.

# The Cut

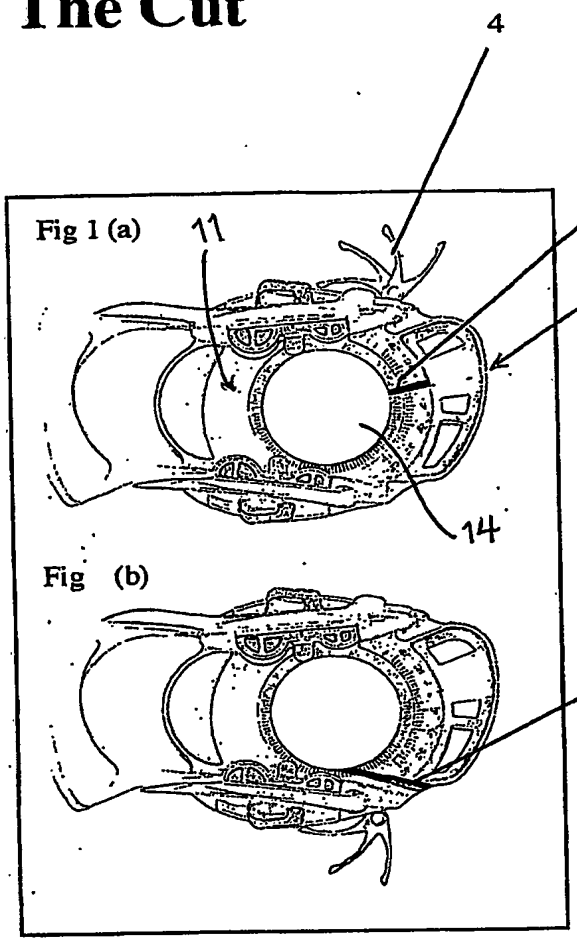



Fig 1. Cut at toe end. (Preferred position.)

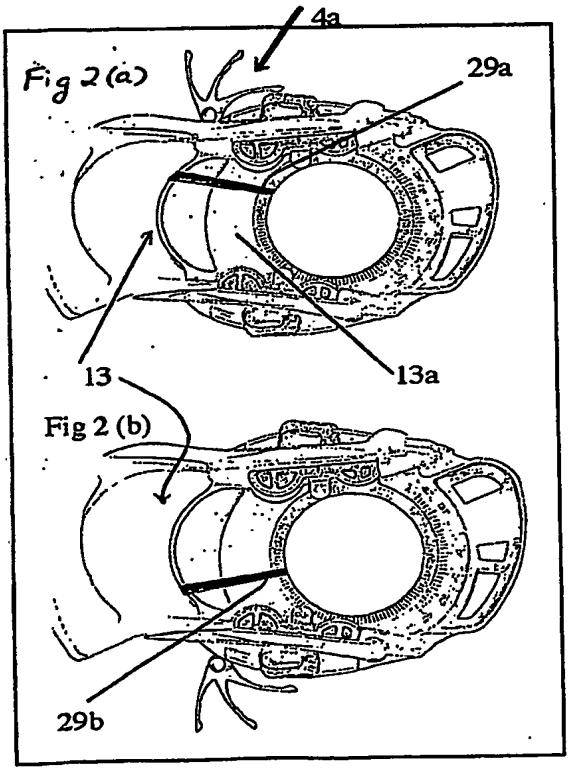



Fig 2. Cut at rear.

## Shape of cut

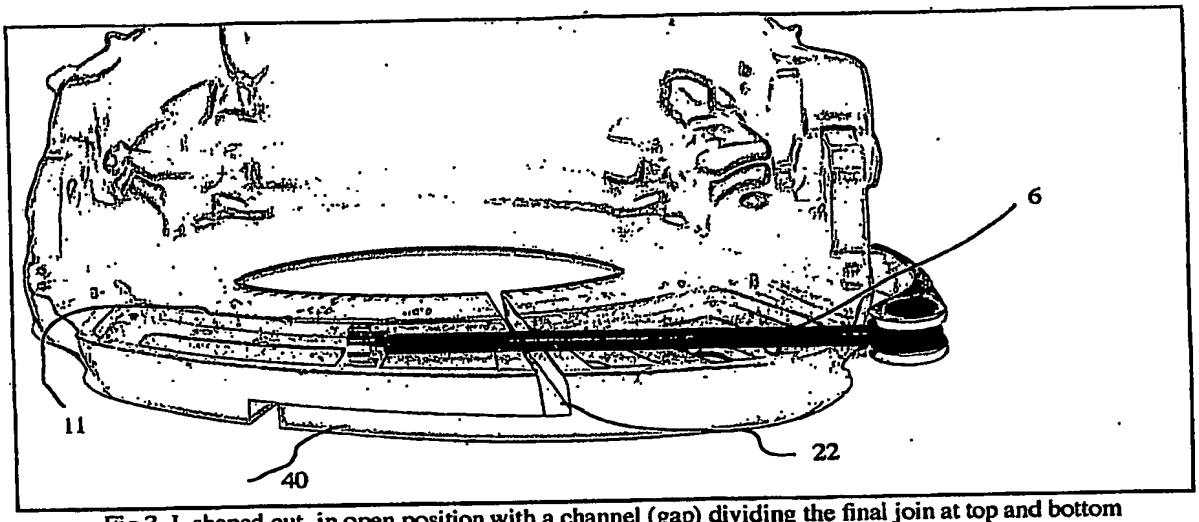



Fig 3. L shaped cut in open position with a channel (gap) dividing the final join at top and bottom side (preferred option)

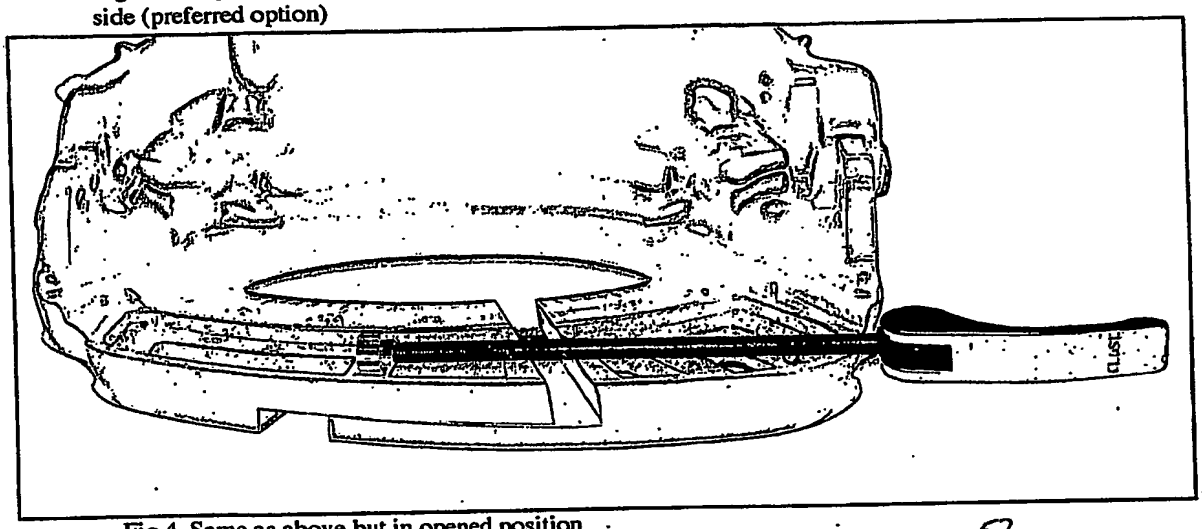



Fig 4. Same as above but in opened position

Fig 7(a)

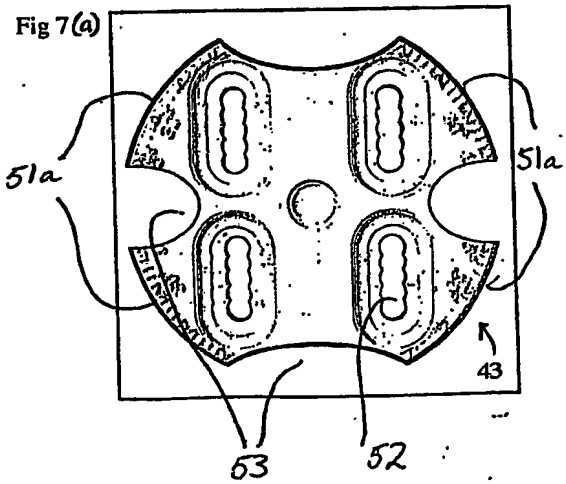
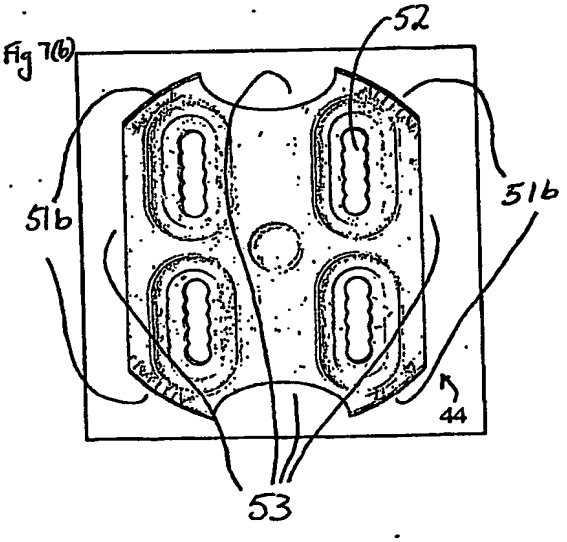



Fig 7(b)



Other Options

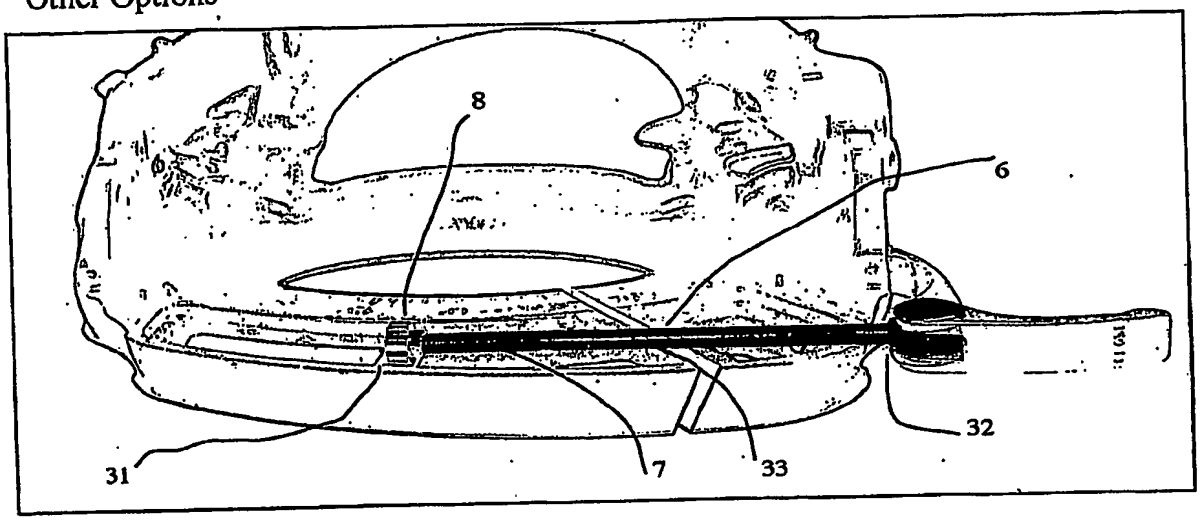



Fig 5

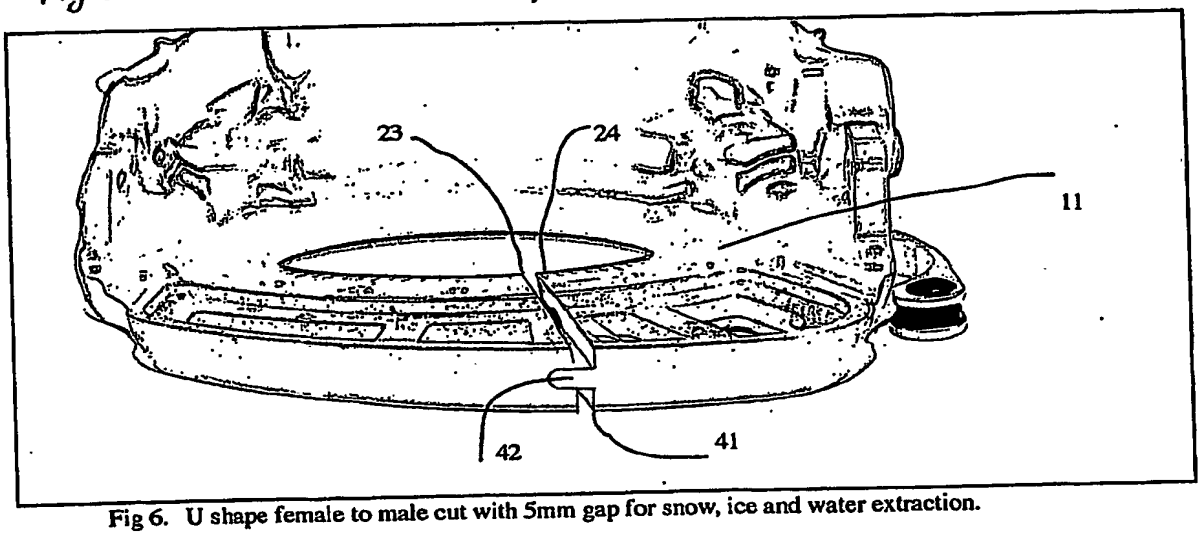



Fig 6. U shape female to male cut with 5mm gap for snow, ice and water extraction.

Fig 7(c)

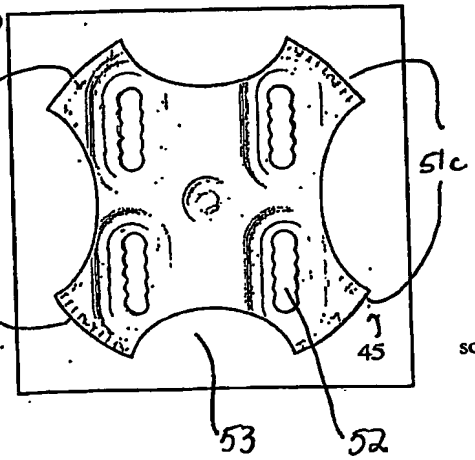
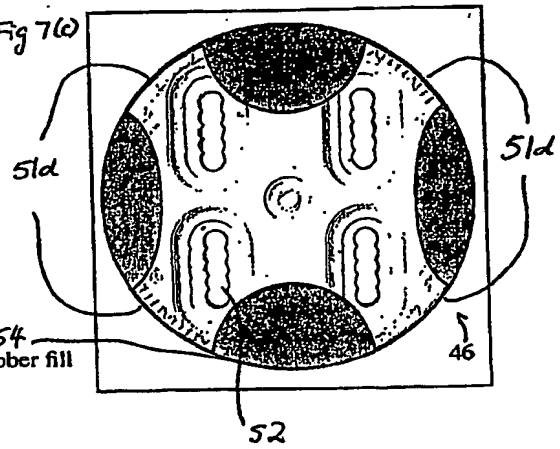



Fig 7(d)



## Latch

### preferred option

Attached to latch at in/out side toe position.

Internal mechanism housed inside plastic moulding of binding. Self-adjusting nut/bolt/latch for tightening.

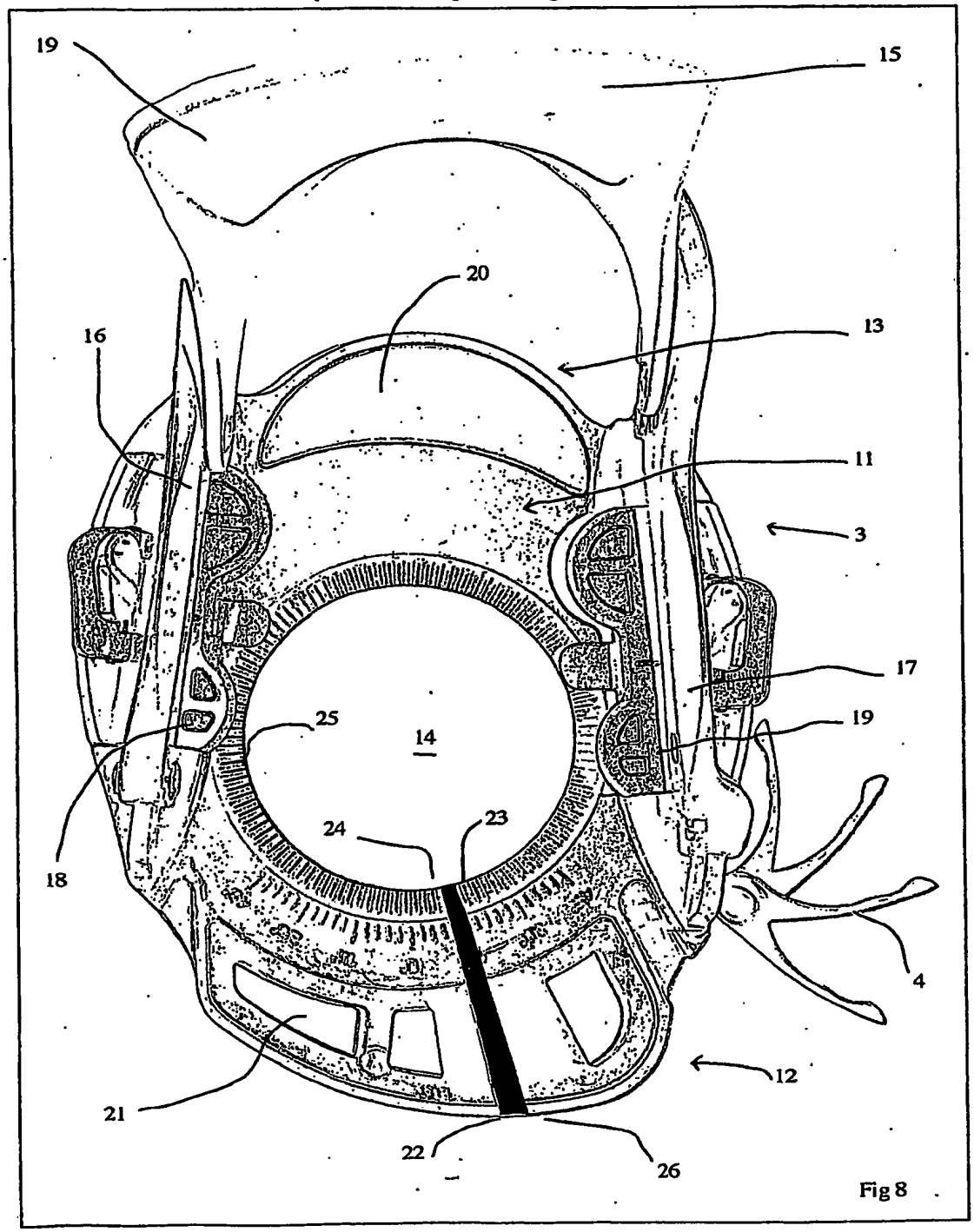



Fig 8

## Bolt direction and length.

Bolt passes through binding mould and cut to receiving bolt house on opposite side of cut.

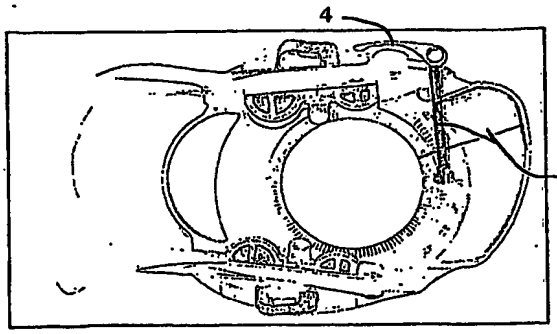



Fig 10

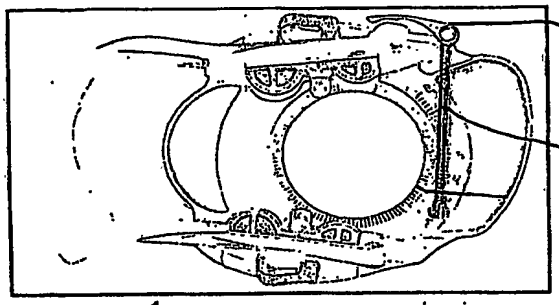



Fig 11

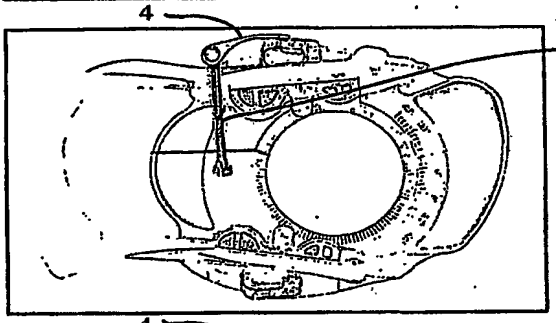



Fig 12

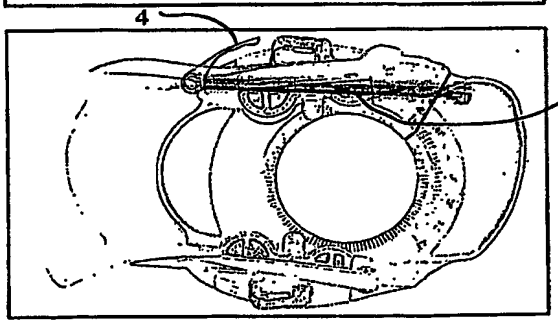



Fig 13

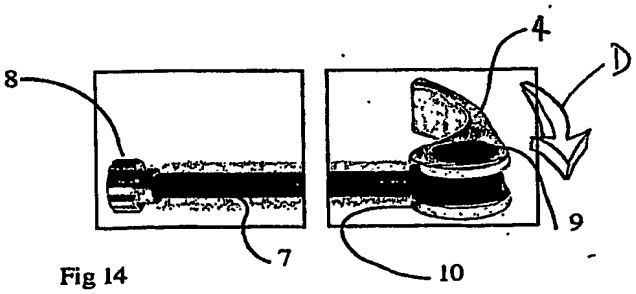



Fig 14

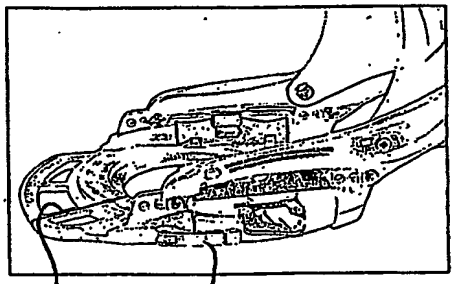



Fig 9

## Sprocket/Teeth

Preferred

Removal of teeth from –45 to + 45 degrees at front binding toe plus removal of teeth At back of binding (heel) –45 to +45 degrees.

Options

Teeth only from 270 to 315 degrees or approx 9 o'clock to 11 o'clock

Or no teeth on binding (Fig 16)

Or no teeth on plate (Fig 18)

Or no teeth on plate or binding (Fig 21) on page 8

Option to replaced plastic disc with hard rubber (preferred) or hard rubber moulding binding teeth..

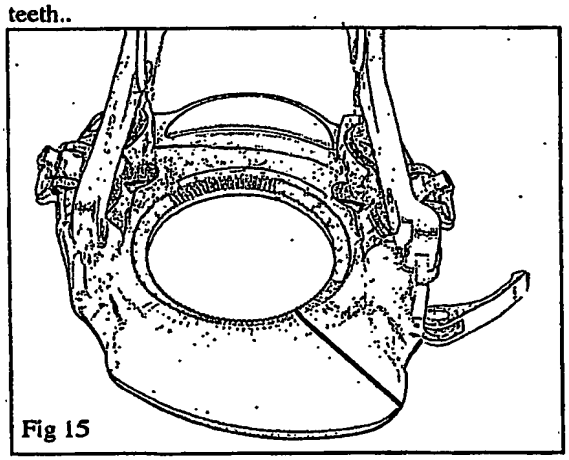


Fig 15

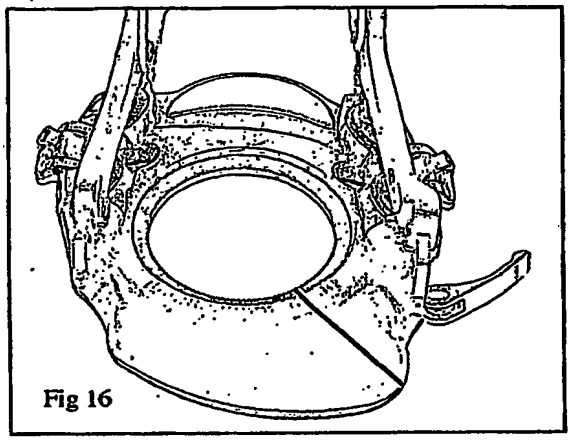


Fig 16

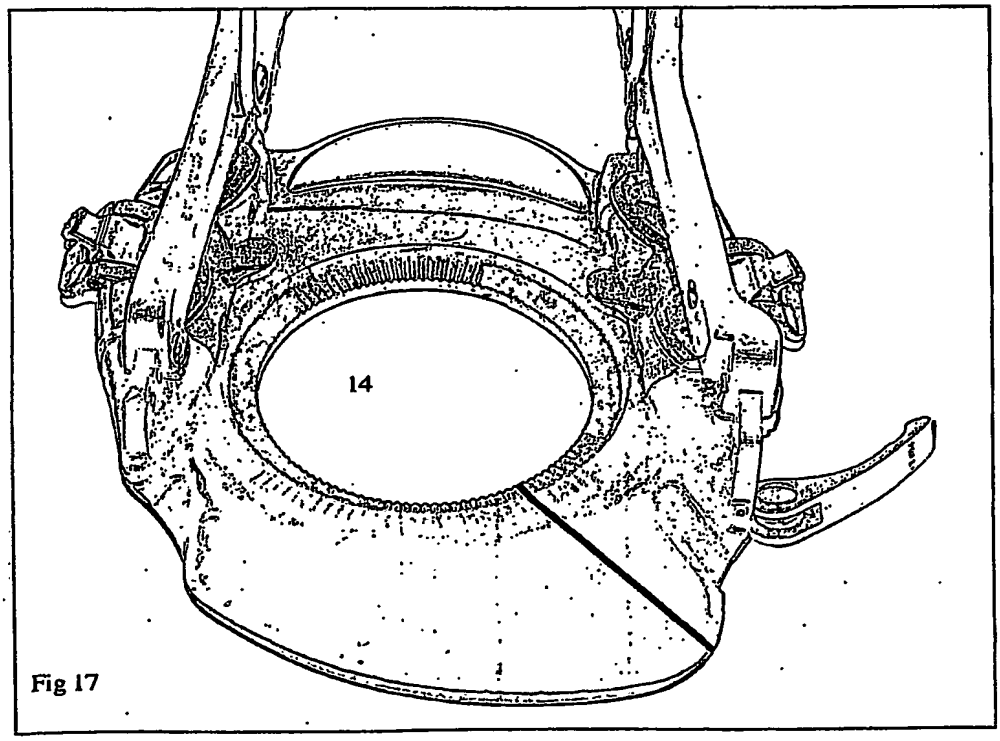



Fig 17

## Rubber Disc/Plate

Rubber washer disc sandwiched between binding and disk.
Options for implementing rubber washer would include.

no teeth on binding
no teeth on plate (Fig 18)
no teeth on plate or binding (Fig 21) over page

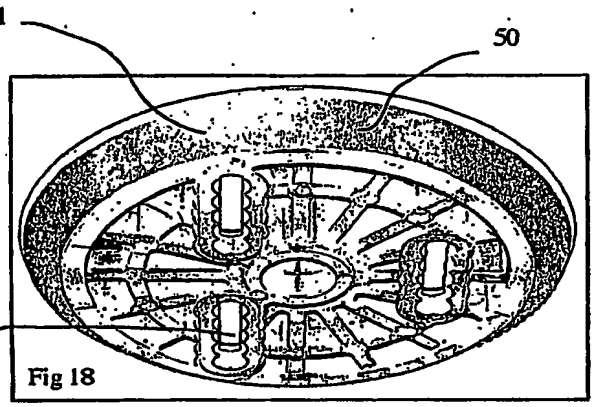


Fig 18

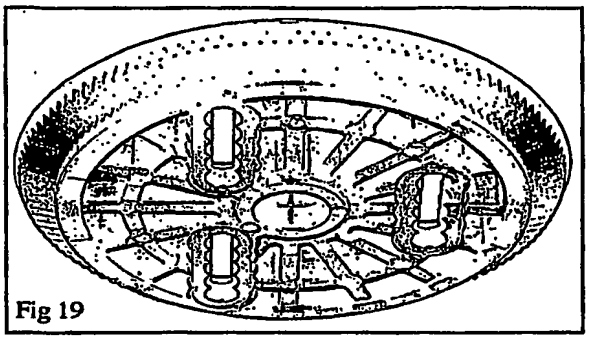


Fig 19

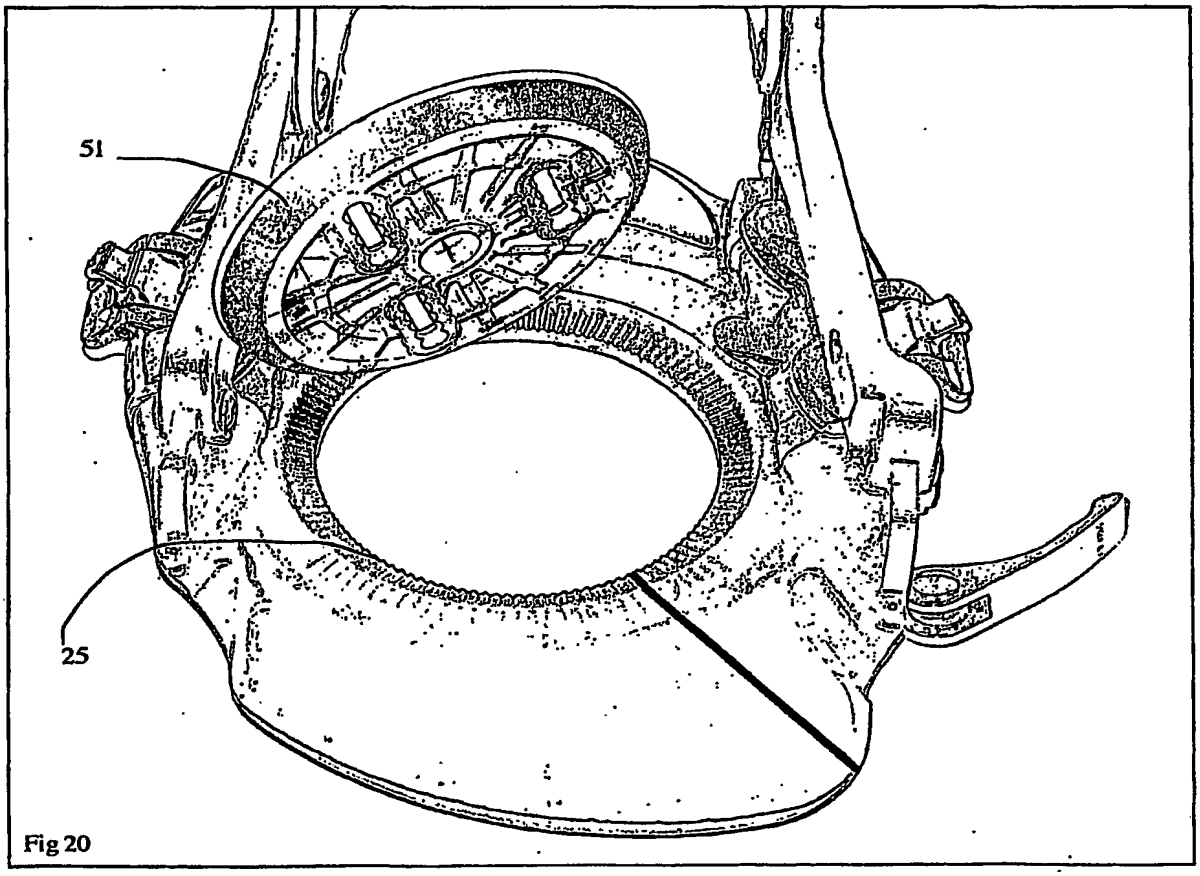


Fig 20

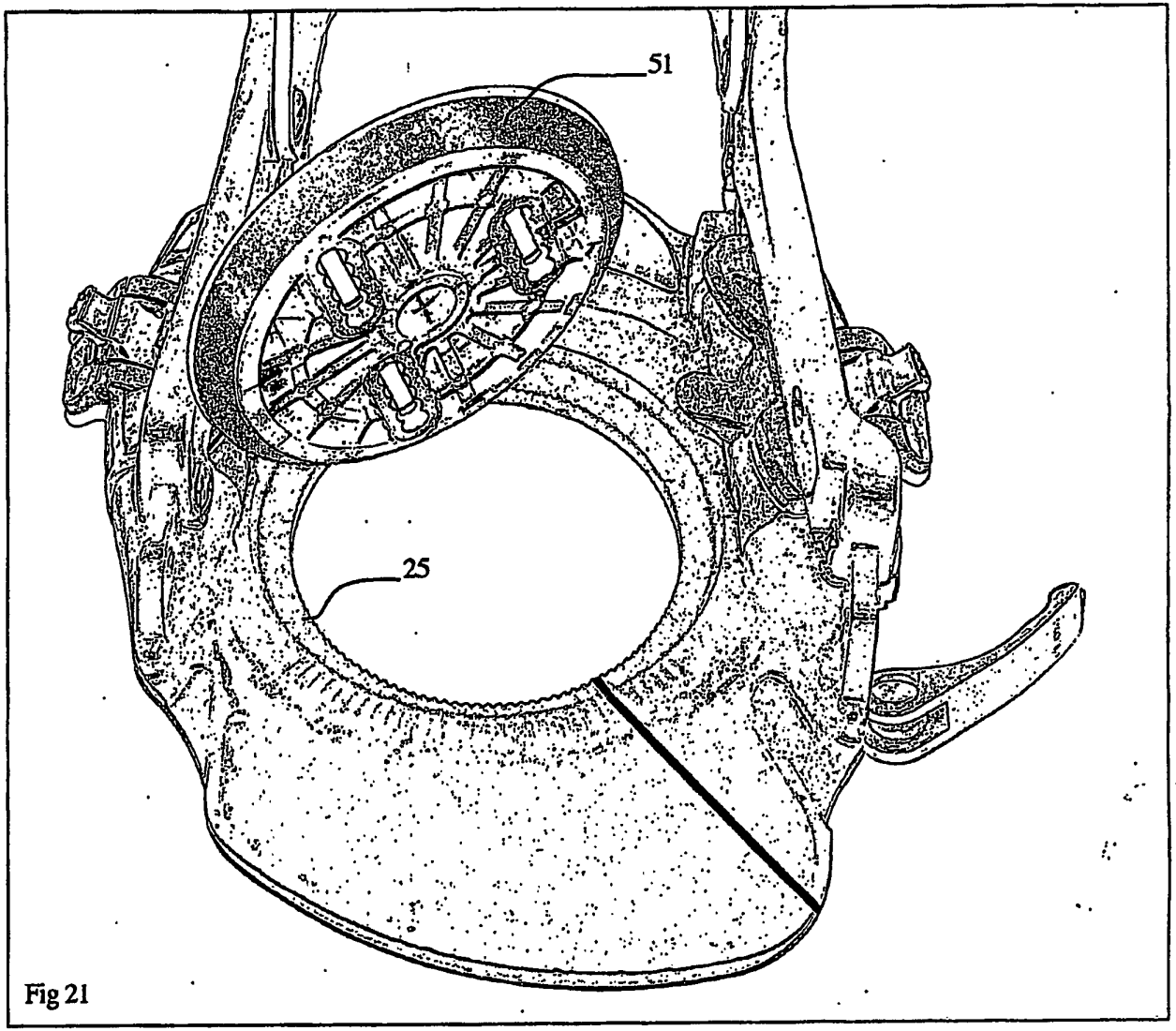



Fig 21

No teeth on plate or binding

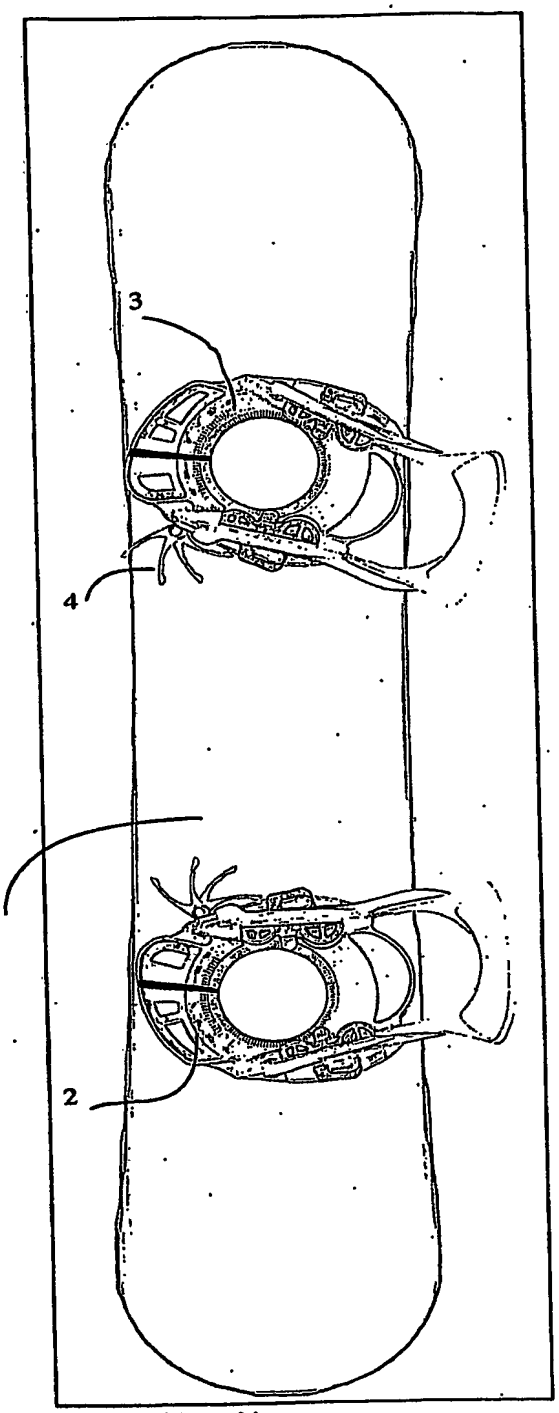



Fig 22 Ride Position

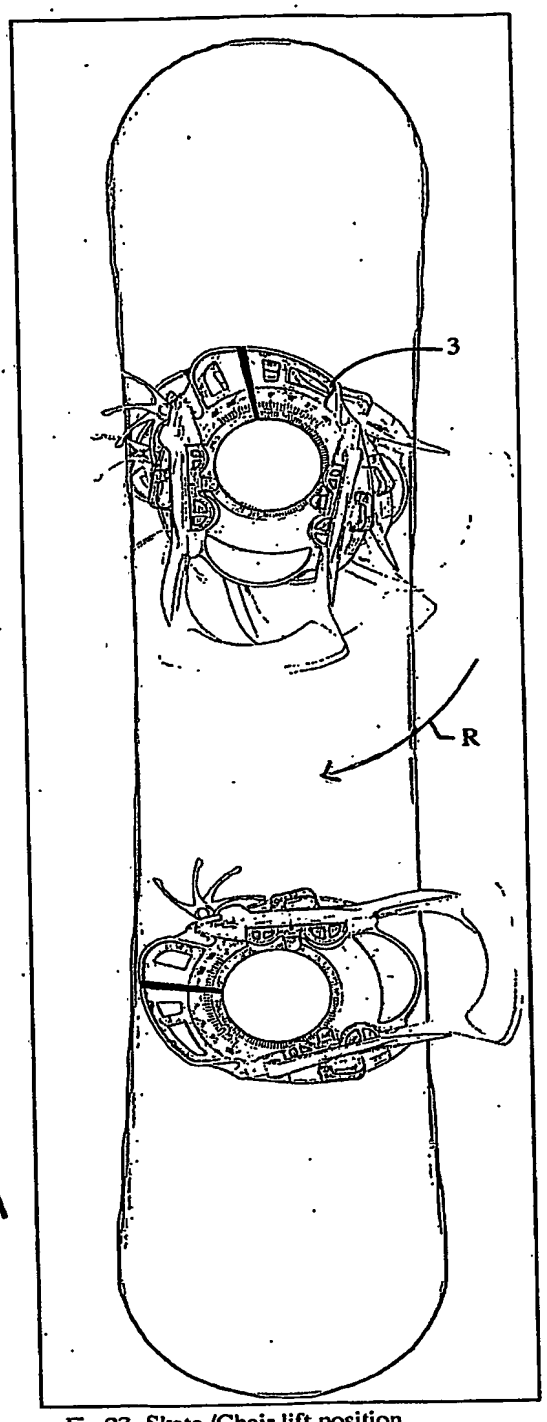



Fig 23 Skate /Chair lift position

Direction of travel

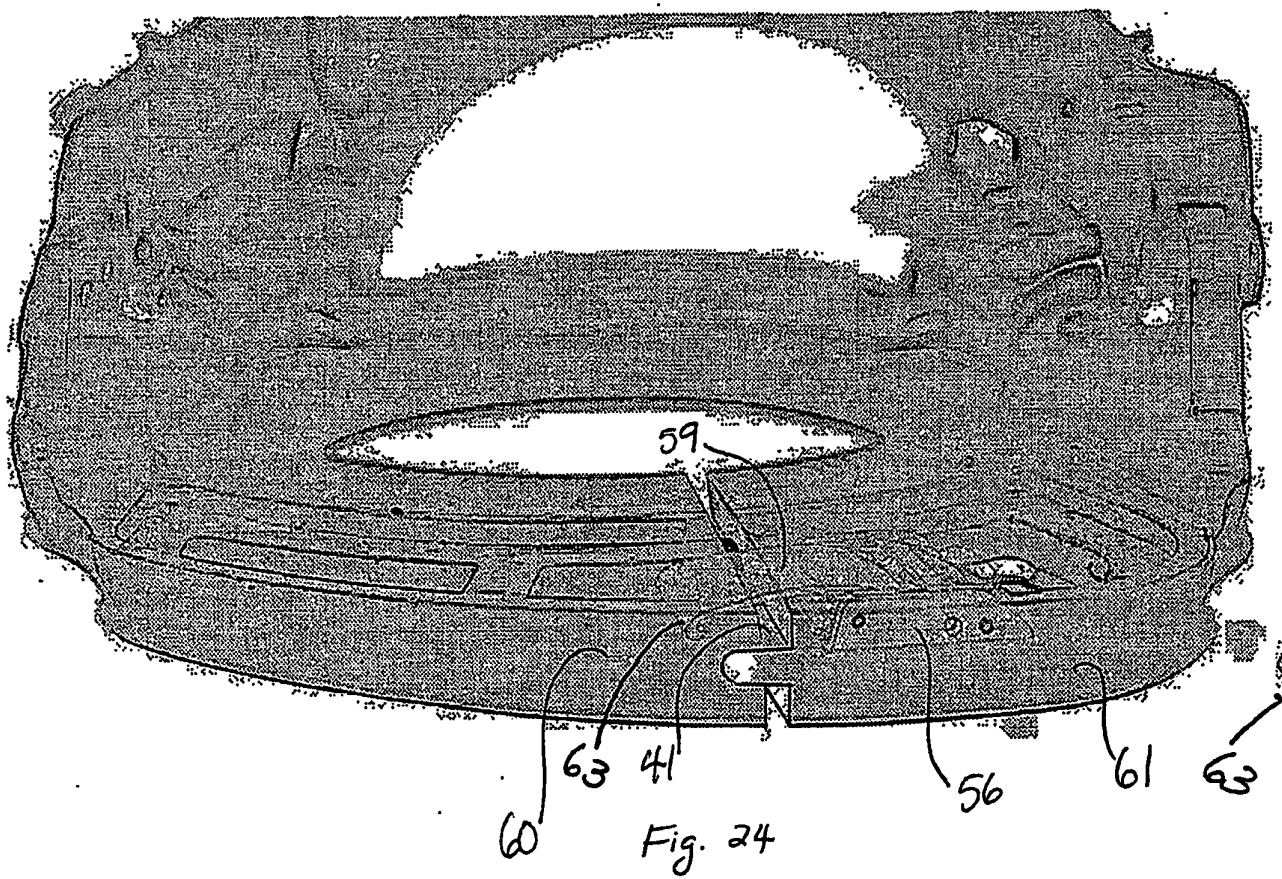



Fig. 24

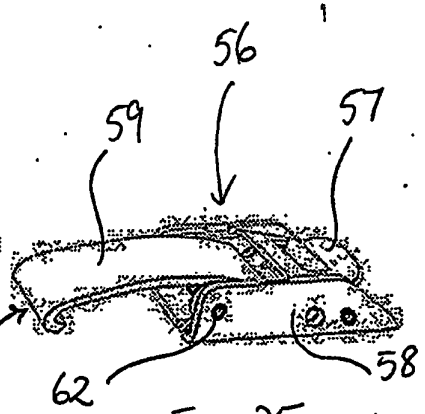



Fig. 25